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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,861	06/20/2000	Maya Rani Gupta	74451.P116	5709

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EXAMINER

LEE, TOMMY D

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/597,861

Applicant(s)

GUPTA ET AL.

Examiner

Thomas D. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17-39, 41 and 43 is/are rejected.
- 7) ☒ Claim(s) 16, 40 and 42 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 9-12 and 28-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not clearly define "integer programming", "dynamic programming", "approximate linear programming solution" or "approximate maximum entropy solution," as recited in the above claims. The specification does state that linear programming reduces or minimizes a distance between a target color and the output color average (page 24, line 19 – page 25, line 2), but goes on to define the reduced distance as "the L1 or sup norm," (page 25, line 4). It is not clear what "L1" or "sup norm" refer to.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8, 13-15, 17, 18, 23-37 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites "The method defined in Claim 7 *wherein the average color distance output color is the set exactly or approximately.*" This recitation does not make sense. It is not clear what is meant by "the set exactly or approximately." Furthermore, "the average color distance output color" lacks antecedent basis. Claim 27 recites a similar limitation.

Claim 13 recites "The method defined in Claim 1 *wherein dividing a block into subblocks comprises ...*" (italics added), thereby implying that a step of dividing a block into subblocks was previously recited in independent claim 1. However, no such step is recited in claim 1 (the step is recited in claim 2). Claims 14 and 15 depend from claim 13, and are thus rejected as being indefinite as well.

Claims 17 and 18 each recite "The method defined in Claim 16 *wherein tessellating colors within each block comprises ...*" (italics added), thereby implying that a step of tessellating colors within each block was previously recited in either claim 16 or independent claim 1. However, no such step is recited in these claims. Claim 16 recites a step of *positioning* colors within each block. If "tessellating" in claims 17 and

18 refers to "positioning" in claim 16, then claims 17 and 18 should be amended so that the terminology used is consistent with the terminology used in claim 16.

"Apparatus" claims 23-37 each depend, either directly or indirectly, from "article of manufacture" claim 19. It is believed that applicant meant to write these claims so as to depend from "apparatus" claim 20. If this is the case, then those claims that, as currently written, depend from claim 19 should be amended so as to depend from claim 20.

"Apparatus" claim 42 depends from "method" claim 39. If claim 42 was meant to depend from "apparatus" claim 41, then this claim should be amended accordingly.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-5, 19-24, 38, 39, 41 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,377,018 (Rafferty).

Regarding claims 1-5 and 19, Rafferty teaches a method comprising: dividing an input image and an output image into blocks, wherein each block in the output image

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corresponds to one block in the input image (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50); in decompression, color values determined for each pixel in block (column 5, lines 43-54)); calculating a color average of each input block (mean values for red, green and blue colors computed (column 3, line 60 – column 4, line 7)); calculating a set of output colors for each block in the output image to match the color average of its corresponding block in the input image (in decompression, color values determined for each pixel in block (column 5, lines 43-54)); and generating an indication to control positioning of the set of output colors in said each block of the output image (in decompression, either high color or low color used for each pixel in the block (column 52-54)). Rafferty also teaches an article of manufacture having a recordable medium storing executable instructions which, when executed by a system causes the system to perform the above steps (process may be controlled by a computer program (column 2, lines 4-9)). The method further comprises dividing each input and output block into subblocks in response to a certain criteria being met, wherein the criteria for dividing a block into subblocks is whether the block contains an edge (high entropy blocks containing an edge further subdivided into smaller sub-blocks (column 3, lines 4-35)). Characteristics of the block, including one or more of size, shape and expected viewing distance, are such that a human eye averages colors associated with the block (size of block is 4 x 4 pixels (column 2, lines 53-55), which is small enough that a human eyes averages colors associated with the block).

Regarding claims 20-24, Rafferty teaches an apparatus comprising: a divider to divide an image and an output image into blocks, wherein each block in the output image corresponds to one block in the input image (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50); in decompression, color values determined for each pixel in block (column 5, lines 43-54)); first logic to calculate a color average for each input block (mean values for red, green and blue colors computed (column 3, line 60 – column 4, line 7)); second logic to calculate a set of output colors for each block in the output image to match the color average of its corresponding block in the input image (in decompression, color values determined for each pixel in block (column 5, lines 43-54)); and indication generation logic to generate an indication to control positioning of the set of output colors in said each block of the output image (in decompression, either high color or low color used for each pixel in the block (column 52-54)). The divider divides each input and output block into subblocks in response to a certain criteria being met, the criteria for dividing a block into subblocks is whether the block contains an edge (high entropy blocks containing an edge further subdivided into smaller sub-blocks (column 3, lines 4-35)). Characteristics of the block, including one or more of size, shape and expected viewing distance, are such that a human eye averages colors associated with the block (size of block is 4 x 4 pixels (column 2, lines 53-55), which is small enough that a human eyes averages colors associated with the block). Note that method may be implemented using logic circuitry (column 5, lines 31-36, 43-45).

Regarding claim 38, Rafferty teaches an apparatus comprising: means for dividing an input image and an output image into blocks, wherein each block in the output image corresponds to one block in the input image (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50)); in decompression, color values determined for each pixel in block (column 5, lines 43-54)); means for calculating a color average of each input block (mean values for red, green and blue colors computed (column 3, line 60 – column 4, line 7)); means for calculating a set of output colors for each block in the output image to match the color average of its corresponding block in the input image (in decompression, color values determined for each pixel in block (column 5, lines 43-54)); and means for generating an indication to control positioning of the set of output colors in said each block of the output image (in decompression, either high color or low color used for each pixel in the block (column 52-54)).

Regarding claim 39, Rafferty teaches a method comprising: dividing the input image and the output image into blocks comprising adaptively sizing blocks with edges to create a plurality of blocks without edges (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50)); in decompression, color values determined for each pixel in block (column 5, lines 43-54); high entropy blocks containing an edge further subdivided into smaller sub-blocks (column 3, lines 4-35)); and computing a set of output colors that best renders a color average of the input image for the corresponding block (in decompression, color values determined for each pixel in block (column 5, lines 43-54)).

Regarding claim 41, Rafferty teaches an apparatus comprising: means for dividing the input image and the output image into blocks comprising means for adaptively sizing blocks with edges to create a plurality of blocks without edges (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50); in decompression, color values determined for each pixel in block (column 5, lines 43-54); high entropy blocks containing an edge further subdivided into smaller sub-blocks (column 3, lines 4-35)); and means for computing a set of output colors that best renders a color average of the input image for the corresponding block (in decompression, color values determined for each pixel in block (column 5, lines 43-54)).

Regarding claim 43, Rafferty teaches an apparatus comprising: a divider to divide the input image and the output image into blocks by means for adaptively sizing blocks with edges to create a plurality of blocks without edges (in compression, image divided into plurality of individual rectangular blocks (column 2, lines (47-50); in decompression, color values determined for each pixel in block (column 5, lines 43-54); high entropy blocks containing an edge further subdivided into smaller sub-blocks (column 3, lines 4-35)); and computation logic to compute a set of output colors that best renders a color average of the input image for the corresponding block (in decompression, color values determined for each pixel in block (column 5, lines 43-54); method may be implemented using logic circuitry (column 5, lines 31-36, 43-45)).

8. Claims 1, 4-6, 20 and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,369,827 (Pan et al.).

Regarding claims 1 and 4-6, Pan et al. teach a method comprising: dividing an input image and an output image into blocks, wherein each block in the output image corresponds to one block in the input image and calculating a color average of each input block (column 9, lines 51-54); calculating a set of output colors for each block in the output image to match the color average of its corresponding block in the input image and generating an indication to control positioning of the set of output colors in said each block of the output image (column 9, lines 55-58). Characteristics of the block, including one or more of size, shape and expected viewing distance, are such that a human eye averages colors associated with the block (size of block is 2 pixels x 2 pixels (column 9, line 53), which is small enough that a human eyes averages colors associated with the block). Calculating the set of output colors is performed by examining possible values achievable in a color space and locating an achievable value closest to the color average of the corresponding input block (column 9, lines 34-50).

Regarding claims 20 and 23-25, Pan et al. teach an apparatus comprising: a divider to divide an image and an output image into blocks, wherein each block in the output image corresponds to one block in the input image and first logic to calculate a color average for each input block (column 9, lines 51-54); second logic to calculate a set of output colors for each block in the output image to match the color average of its corresponding block in the input image and indication generation logic to generate an indication to control positioning of the set of output colors in said each block of the output image (column 9, lines 55-58). Characteristics of the block, including one or more of size, shape and expected viewing distance, are such that a human eye

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averages colors associated with the block (size of block is 2 pixels x 2 pixels (column 9, line 53), which is small enough that a human eyes averages colors associated with the block). Calculating the set of output colors is performed by examining possible values achievable in a color space and locating an achievable value closest to the color average of the corresponding input block (column 9, lines 34-50).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 7, 8, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan et al.

Pan et al. do not explicitly state that a look-up table on the average color is used for determining output colors. However, it is well known that look-up tables are often used for mapping input colors to output colors. It is known that mapping an input to an output through a look-up table allows for quick determination of the output without the need to perform mathematical computations for each input, thereby saving time, and thus it would have been obvious for one of ordinary skill in the art to provide a look-up table in the device taught by Pan et al. for determining output colors based on the input colors. In Pan et al. the color distance output color is either exact or approximate (column 9, lines 44-54).

Allowable Subject Matter

11. Claims 16, 40 and 42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claims 13-15, 17, 18 and 32-37 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to teach or suggest the step of dividing a block into subblocks if the difference between a calculated function of the color value of the block and subblocks is greater than a threshold, as recited in claims 13 and 32; or the step of positioning colors within each block to match a target and reduce spatial artifacts given the set of output colors, as recited in claims 16 and 35; or the step of pre-warping an input image's color gamut to adjust for the output color gamut, as recited in claims 40 and 42.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,341,441 (Maeda et al.) discloses an apparatus for coding image information, wherein mean values are calculated for color components in a pixel block, and the mean values are vector-quantized using a code book.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-

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4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thomas D. Lee
Primary Examiner
Art Unit 2624

tdl
February 6, 2004